

What is claimed is:

1. A driving method for an electron-emitting device in which an electron-emitting member including a plurality of carbon fibers is made to emit electrons by a voltage being applied between a cathode electrode on which the electron-emitting member is formed and a counter electrode disposed in opposition to the cathode electrode, comprising the step of:

applying a driving voltage V smaller than a maximum applied voltage V_{max} between the cathode electrode and the counter electrode to drive the electron-emitting device, the maximum applied voltage V_{max} being a maximum voltage applied between the cathode electrode and the counter electrode before the start of driving.

2. A driving method for the electron-emitting device according to claim 1, wherein the plurality of carbon fibers is one kind selected from among a plurality of carbon nanotubes, a plurality of graphite nanofibers and a mixed plurality of carbon nanotubes and graphite nanofibers.

3. A driving method for an electron source including a plurality of electron-emitting devices formed on a substrate, in each of which an electron-emitting member including a plurality of carbon fibers

is capable of emitting electrons when a driving voltage is applied between a cathode electrode on which the electron-emitting member is formed and a counter electrode disposed in opposition to the cathode electrode, comprising the steps of:

applying a voltage V_{max} higher than the driving voltage to a first electron-emitting device to cause an I-V characteristic of the first electron-emitting device and an I-V characteristic of a second electron-emitting device to become closer to each other, the first electron-emitting device being operative to emit a relatively larger number of electrons among the plurality of electron-emitting devices when a predetermined voltage is applied, the second electron-emitting device being operative to emit a relatively smaller number of electrons among the plurality of electron-emitting devices when the predetermined voltage is applied; and

applying, according to input data, a driving voltage V smaller than the maximum applied voltage V_{max} between the cathode electrode and the counter electrode to drive the plurality of electron-emitting devices.

4. A driving method for the electron source according to claim 3, wherein the plurality of carbon fibers is one kind selected from among a plurality of

carbon nanotubes, a plurality of graphite nanofibers and a mixed plurality of carbon nanotubes and graphite nanofibers.

5. A manufacturing method for an electron source including a plurality of electron-emitting devices formed on a substrate, in each of which an electron-emitting member including a plurality of carbon fibers is capable of emitting electrons when a driving voltage is applied between a cathode electrode on which the electron-emitting member is formed and a counter electrode disposed in opposition to the cathode electrode, comprising the steps of:

preparing a plurality of cathode electrodes each having an electron-emitting member including a plurality of carbon fibers and a counter electrode to be opposed to the plurality of cathode electrodes; and

applying a voltage higher than the driving voltage between the counter electrode and each of cathode electrodes to cause an I-V characteristic of the first electron-emitting member and an I-V characteristic of a second electron-emitting member to become closer to each other, the first electron-emitting member being operative to emit a relatively larger number of electrons when a predetermined voltage is applied, the second electron-emitting member being operative to emit a relatively smaller

number of electrons when the predetermined voltage is applied.

6. A manufacturing method for the electron source according to claim 5, wherein each of the plurality of carbon fibers is one kind selected from among a plurality of carbon nanotubes, a plurality of graphite nanofibers and a mixed plurality of carbon nanotubes and graphite nanofibers.

7. A manufacturing method for an electron source including a plurality of electron-emitting devices formed on a substrate, in each of which an electron-emitting member including a plurality of carbon fibers is capable of emitting electrons when a driving voltage is applied between a cathode electrode on which the electron-emitting member is formed and a counter electrode disposed in opposition to the cathode electrode, comprising the steps of:

applying a voltage higher than the driving voltage to a first electron-emitting device to cause an I-V characteristic of the first electron-emitting device and an I-V characteristic of a second electron-emitting device to become closer to each other, the first electron-emitting device being operative to emit a relatively larger number of electrons among the plurality of electron-emitting devices when a

predetermined voltage is applied, the second electron-emitting device being operative to emit a relatively smaller number of electrons among the plurality of electron-emitting devices when the predetermined voltage is applied.

8. A manufacturing method for the electron source according to claim 7, wherein the plurality of carbon fibers is one kind selected from among a plurality of carbon nanotubes, a plurality of graphite nanofibers and a mixed plurality of carbon nanotubes and graphite nanofibers.

9. An image display apparatus comprising:
a plurality of electron-emitting devices in each of which an electron-emitting member including a plurality of carbon fibers is capable of emitting electrons when a driving voltage is applied between a cathode electrode on which the electron-emitting member is formed and a counter electrode disposed in opposition to the cathode electrode;

a luminescent material;

a control circuit for applying a voltage V_{max} higher than the driving voltage to a first electron-emitting device to cause an I-V characteristic of the first electron-emitting device and an I-V characteristic of a second electron-emitting device to

become closer to each other, the first electron-emitting device being operative to emit a relatively larger number of electrons among the plurality of electron-emitting devices when a predetermined voltage is applied, the second electron-emitting device being operative to emit a relatively smaller number of electrons among the plurality of electron-emitting devices when the predetermined voltage is applied; and

a circuit for applying, according to input data, a driving voltage V smaller than the maximum applied voltage V_{max} between the cathode electrode and the counter electrode to drive the plurality of electron-emitting devices.